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(54) Title: PRESSURE DRIVEN SEPARATIONS OF LIQUID FEEDS

(57) Abstract: Membranes consisting of an elastomeric matrix with dispersed fillers are used in the pressure driven separation of liquid feeds. The fillers are selected in such a way that the interactions between the filler and the elastomer keep the membrane swelling limited, resulting in higher rejections.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B01D69/14 B01D61/02 B01D61/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, COMPENDEX, INSPEC, CHEM ABS Data, PAJ

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	VANKELECOM I.F.J., DEPRE D.,: "Influence of Zeolites in PDMS Membranes: Pervaporation of Water/Alcohol Mixtures" JOURNAL OF PHYSICAL CHEMISTRY, vol. 99, 7 March 1995 (1995-03-07), pages 13193-13197, XP002329263 abstract page 1, paragraphs 1,2 page 2, lines 30-60	1-14

Further documents are listed in the continuation of box C.	χ Patent family members are listed in annex.		
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	<u> </u>
Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
VANKELECOM I.F.J, SCHEPPERS E., HEUS R., UYTTERHOEVEN J.B.: "Parameters influencing zeolite incorporation in PDMS membranes" JOURNAL OF PHYSICAL CHEMISTRY, vol. 98, 11 July 1994 (1994-07-11), pages 12390-12396, XP002329264 abstract page 12395, lines 38,39 page 12390	1-14
WO 03/072232 A (CREAVIS GESELLSCHAFT FUER TECHNOLOGIE UND INNOVATION MBH; HENNIGE, VOL) 4 September 2003 (2003-09-04) abstract pages 4-5 pages 8,9 claims 9,10,12	1-14
PATENT ABSTRACTS OF JAPAN vol. 007, no. 195 (C-183), 25 August 1983 (1983-08-25) & JP 58 095524 A (KURARAY KK), 7 June 1983 (1983-06-07) abstract	
CHEN X., ZHENGHUA P., YINGCAI L.: "Separation properties of alcohol-water mixture through silicalit-I-filled silicone rubber membranes by pervaporation" JOURNAL OF APPLIED POLYMER SCIENCE, vol. 67, 27 May 1997 (1997-05-27), pages 629-636, XP002329265 the whole document	
LEBLANC J.: "Elastomer-Filler Interactions and the Rheology of filled rubber compounds" JOURNAL OF APPLIED POLYMER SCIENCE, vol. 78, 2 May 2000 (2000-05-02), pages 1541-1550, XP002329266 the whole document	1-14
MULDER M.: "Basic Principles of Membrane Technology" 1990, KLUWER ACADEMIC , DORDRECHT , XP002329557 page 202 - page 220	1
	UYTTERHOEVEN J.B.: "Parameters influencing zeolite incorporation in PDMS membranes" JOURNAL OF PHYSICAL CHEMISTRY, vol. 98, 11 July 1994 (1994-07-11), pages 12390-12396, XP002329264 abstract page 12395, lines 38,39 page 12390 WO 03/072232 A (CREAVIS GESELLSCHAFT FUER TECHNOLOGIE UND INNOVATION MBH; HENNIGE, VOL) 4 September 2003 (2003-09-04) abstract pages 4-5 pages 8,9 claims 9,10,12 PATENT ABSTRACTS OF JAPAN vol. 007, no. 195 (C-183), 25 August 1983 (1983-08-25) & JP 58 095524 A (KURARAY KK), 7 June 1983 (1983-06-07) abstract CHEN X., ZHENGHUA P., YINGCAI L.: "Separation properties of alcohol-water mixture through silicalit-I-filled silicone rubber membranes by pervaporation" JOURNAL OF APPLIED POLYMER SCIENCE, vol. 67, 27 May 1997 (1997-05-27), pages 629-636, XP002329265 the whole document LEBLANC J.: "Elastomer-Filler Interactions and the Rheology of filled rubber compounds" JOURNAL OF APPLIED POLYMER SCIENCE, vol. 78, 2 May 2000 (2000-05-02), pages 1541-1550, XP002329266 the whole document MULDER M.: "Basic Principles of Membrane Technology" 1990, KLUWER ACADEMIC , DORDRECHT , XP002329557

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INTERNATIONAL SEARCH REPORT nformation on patent family members

In tional Application No
FC I / BE2004/000177

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
WO 03072232	A	04-09-2003	DE AU WO EP US	10208278 A1 2003248331 A1 03072232 A1 1483042 A1 2005087491 A1	04-09-2003 09-09-2003 04-09-2003 08-12-2004 28-04-2005
JP 58095524	Α	07-06-1983	NONE		